

PROCEEDINGS
OF THE
CALIFORNIA ACADEMY OF SCIENCES

Vol. 49, No. 5, pp. 151–160, 10 figs., 1 table.

July 10, 1996

A REMARKABLE NEW SPECIES OF *NEBRIA*
(COLEOPTERA: CARABIDAE: NEBRIINI) FROM
NORTH KOREA

By

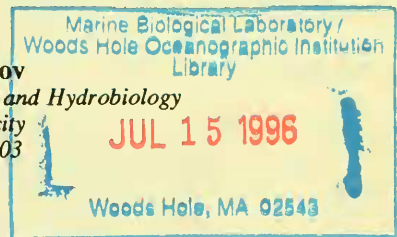
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ABSTRACT: *Nebria scaphelytra*, new species, is described from North Korea (type locality: Myohyang Mountains). Based on features of adult morphology, this species is a highly distinctive member of the *ovipennis* species group of subgenus *Catonebria* Shilenkov and is the second known Palaearctic member of this predominantly Nearctic group.

Received November 13, 1995. Accepted April 2, 1996.

INTRODUCTION

Knowledge of the carabid beetle fauna of both mainland and peninsular portions of North and South Korea has progressed rapidly in recent decades [e.g., compare Kano (1923) with Kwon and Lee (1986)]. Between the 1920s and 1980s, the list of nebriine carabids recorded from this region increased from two species (Csiki, 1927) to twelve species and four additional subspecies (Kwon and Lee, 1986). Individual contributions to this increase in knowledge of the fauna include both descriptions of new species or subspecies (Bänninger, 1933; Semenov Tian-Shanskij and Znojko, 1928;

Horvatovich, 1973; and Shilenkov, 1983) and a synoptic faunal review for North Korea (Shilenkov, 1983). However, new information presented here suggests that the inventory of this fauna remains incomplete.

Several years ago, one of us (DHK) received a parcel, containing adult nebriine carabids from North Korea, sent by Dr. Jerzy Pawlowski [Institute of Systematic and Experimental Zoology, Krakow, Poland (ISEZ)] for identification. Among the specimens sent were a number of interesting forms, including two specimens, one male and one female, that were elegant in form and remarkable in the sculpturing and topography of their dorsal surface. They repre-

sented a species of *Nebria* Latreille unknown to either of us. Recently, having discussed the unique characteristics of these specimens, and based on our collective knowledge of known nebrine taxa, we concluded that these specimens represent an undescribed species.

Other new or little-known taxa were also represented in the North Korean material examined; but evaluation of the appropriate taxonomic status of each of these forms (i.e., whether each represents a distinct species or a subspecies of some described species) will require additional study and analysis of geographical variation in previously described forms. Therefore, the purpose of this paper is to describe this one new species and discuss its subgeneric and species-group affinities, based on synapomorphic (derived) adult features shared with other taxa.

SPECIES DESCRIPTION

Nebria scaphelytra new species

TYPE MATERIAL. — Holotype: a male, in ISEZ, labelled: "Corea sept. 1983 Mjohjang montes, Exp. Inst. Zool. Cr."/"Holotype *Nebria scaphelytra* Kavanaugh & Shilenkov 1995." One paratype, a female, in California Academy of Sciences, labelled: same locality label/"Paratype *Nebria scaphelytra* Kavanaugh & Shilenkov 1995."

TYPE LOCALITY. — Myohyang Mountains, central North Korea.

DERIVATION OF SPECIES EPITHET. — From the Latin, *scapha*, meaning a small boat, and *elytron*, referring to the resemblance between the paired elytra of adults of this species and the inverted hull of a small boat or skiff, complete with keel.

DIAGNOSIS. — The following combination of features distinguishes adults of this species from those of all other *Nebria*: body shiny black, without metallic reflection dorsally; vertex with a pair of paramedial red spots; antennal scape straight; pronotum narrow, markedly cordate, subbasal sinuation of lateral margin deep and very long, midlateral setae present, basolateral setae absent; prosternal intercoxal process with margination complete; elytral silhouette elongate, ovoid, elytron with disc distinctly depressed lateral to slightly raised su-

tural interval in basal fourth, intervals 3, 5, and 7 markedly catenate, each with two or more broadly foveate and deep setiferous punctures; abdominal sterna 3–5 with two or more pairs of posterior paramedial setae, without anterior paralateral setae.

DESCRIPTION. — Size medium, apparent body length (measured from apex of longer mandible to apex of longer elytron) of male 13.0 mm, of female 14.2 mm (see Table 1 for additional measurements). Body slender (Fig. 1), with long and delicate appendages. Color of body black, appendages of head and thorax piceous (tibiae and tarsi slightly paler than femora in female specimen); vertex with a pair of paramedial red spots. Body shiny, elytra more markedly so, without metallic reflection. Microsculpture of head and elytra isodiametric, that of pronotum slightly transverse, sculpticells on head and pronotum smaller and more convex than those on elytra.

Head moderate in size and width, eyes moderately convex, very slightly reduced in size; frontal furrows small, round, deep and wrinkled; antennae markedly long and slender, extended to apical one-fourth of elytra in male, to apical one-third in female; antennal scape (Fig. 2) straight, slightly narrowed basally, more convex anteriorly than posteriorly; labial palpus with penultimate palpomere trisetose; mentum with medial tooth bifid, length slightly less than one-half length of lateral lobes, M2 setae (Kavanaugh, 1979) positioned midway between basal margin and apical emargination; gula with a transverse row of 13–15 setae.

Pronotum (Fig. 3) narrow, markedly cordiform; apical angles narrow, rounded apically, moderately projected anteriorly; basal angles slightly acute, slightly projected posteriorly; sub-basal sinuation of lateral margin deep and long; apical margination restricted to lateral one-fourth; basal margination absent; lateral margination distinct and narrow in apical four-fifths of margin, absent from basal one-fifth; lateral explanation very narrow anteriorly, broadened and continuous with basal foveae posterior to middle; median longitudinal and anterior and posterior transverse impressions deep, well-defined; posterior transverse impression and lateral base with faint wrinkles, base of pronotum with a few fine, well-separated

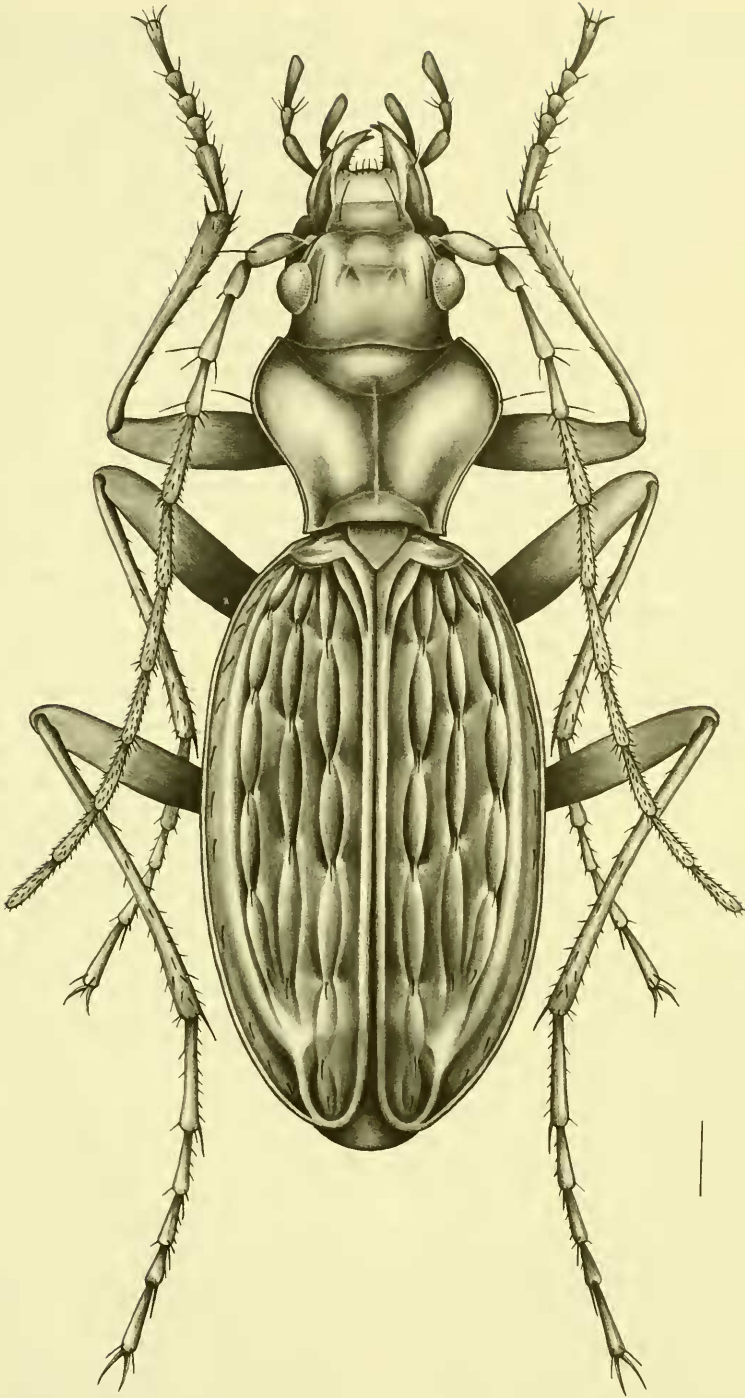


FIGURE 1. Habitus drawing, *Nebria scaphelytra* n. sp., holotype, adult male from Myohyang Mountains, North Korea; scale line = 1.0 mm. (Illustration by J. Speckels.)

TABLE 1. Measurements (in mm) of main body parts.

	Male	Female
HW	2.5	2.6
PW	3.2	3.5
PBW	1.9	2.2
EW	4.5	5.0
HL	1.5	1.5
PL	2.5	2.7
EL	7.5	9.3
SBL	11.5	12.5

Abbreviations: HW = width of head measured across compound eyes; PW = width of pronotum measured across widest point; PBW = width of base of pronotum measured between apices of hind angles; EW = width of elytra measured across widest point; HL = length of head measured along midline from apex of clypeus to a point opposite posterior margin of compound eyes; PL = length of pronotum measured along midline from apical to basal margin; EL = length of longer elytron measured along midline from apex of scutellum to elytral apex; SBL = HL+PL+EL.

punctures; midlateral setae present, positioned well anterior to midpoint; basolateral setae absent.

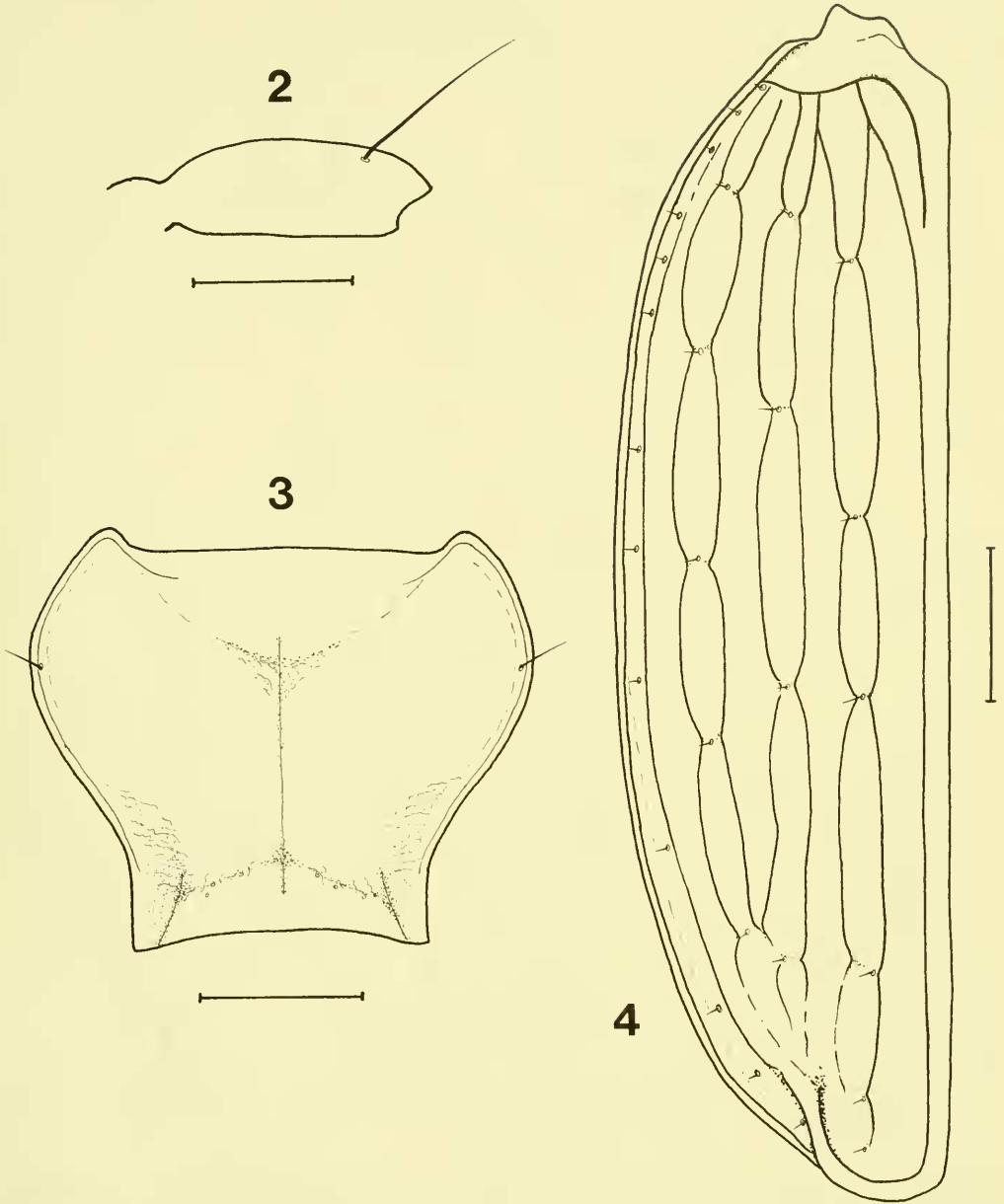
Elytral silhouette ovoid-elongate (Fig. 1), widest at middle. Elytron (Fig. 4) with disc distinctly depressed lateral to sutural interval, especially at base posterior to basal margination; humeri reduced but with marked humeral carina; basal margination markedly sinuate in male, only slightly so in female, joined with lateral margination at a markedly obtuse angle; sutural interval elevated in basal two-thirds in male, in basal one-third in female; intervals 2, 3, 4 and 6 convex basally, slightly convex at middle and apically; intervals 5 and 7 subcarinate basally, more convex than other intervals in basal three-fourths; interval 2 without basal setiferous pore; intervals 3, 5, and 7 markedly catenate, with very broad and deep setiferous foveae; interval 5 markedly carinate subapically; elytral apex broadly truncate and rounded. Hindwing present as a short, narrow, strap-like vestige.

Thoracic venter smooth, impunctate, except mesepisternum with a few fine punctulae; prosternum with margination of intercoxal process complete; metasternum short, length of portion posterior to mesocoxa slightly shorter than diameter of mesocoxa. Abdominal sterna impunctate, but slightly wrinkled laterally; sternum 2 asetose medially and paramedially; sterna 3–5 each with two or three pairs of posterior paramedial setae; anterior paralateral setae absent; sternum 6 with one pair of apical setae in male, two pairs in female.

Hind coxa with two sub-basal and one sub-apical setae; all tarsi without dorsal pubescence; front tarsus of male with tarsomeres 1–3 distinctly broader than those in female and with pads of adhesive setae ventrally; tarsomere 4 only slightly broader in male than in female and without ventral adhesive setae; apex of hind tarsomere 4 markedly projected lateroventrally.

MALE GENITALIA. — Median lobe (Fig. 5) thick and moderately long, slightly twisted right from base to apex (Fig. 5c), axis of curvature about 90° (Fig. 5a), straight in middle one-third, with a shallow, basally-directed invagination in the right lateral wall (Fig. 5b); mid-shaft moderately compressed in cross-section; apex broad and apically rounded, deflected ventrally (in lateral aspect, Fig. 5a) and left (in ventral aspect, Fig. 5c); apical orifice markedly deflected right; internal sac multi-lobed (Fig. 5d, e), with a faint, long, slender anterobasal sclerite and a pair of small, convex sclerites (scl, Fig. 5e) at the gonopore anteroapically. Left paramere (Fig. 6a) shorter than right, broad and broadly rounded apically, right paramere (Fig. 6b) slightly elongate and narrow.

FEMALE GENITALIA. — Sternum 8 (Fig. 7) with basal apodemes broad, markedly emarginate apically, medial and lateral arms equal in length. Ovipositor (Fig. 8) long and slender, medial face of gonostylus (stylocere 2) with a short diagonal row of setae dorsally. Bursa copulatrix (Fig. 9) with spermathecal chamber (sc, Fig. 9a, b) slightly asymmetrical and deflected right, moderately cordate, without posterodorsal accessory lobe, continuity of chambers as in Fig. 9c; spermathecal duct (sd, Fig. 9a) narrow, moderate in length, loosely and irregularly convoluted, inserted posterodorsally at base of spermathecal chamber of bursa; spermatheca (sp, Fig. 9a) lanceolate, moderately ar-

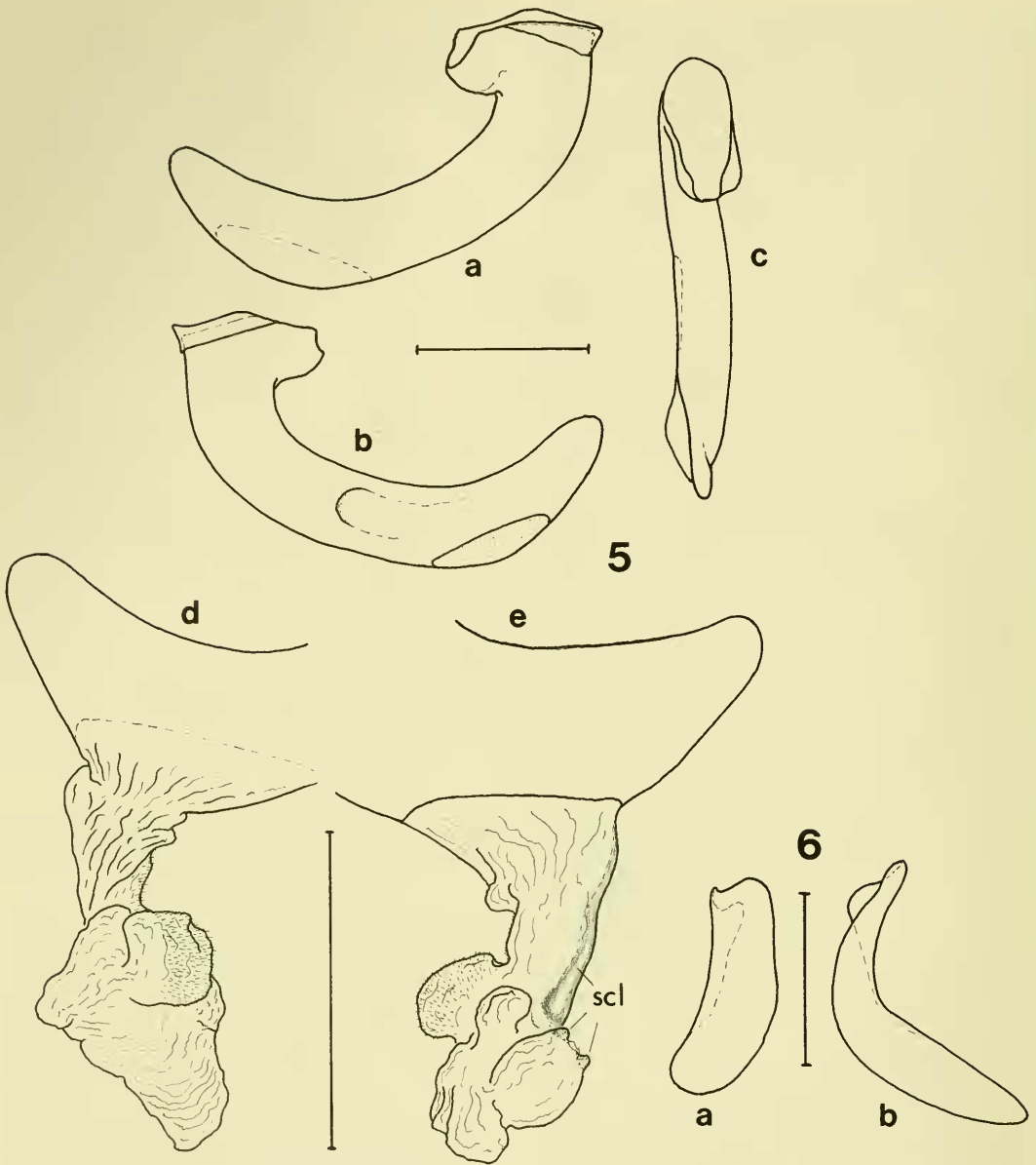


FIGURES 2-4. *Nebria scaphelytra* n. sp. FIGURE 2. Right antennal scape, dorsal aspect; scale bar = 0.5 mm. FIGURE 3. Pronotum, dorsal aspect; scale bar = 1.0 mm. FIGURE 4. Left elytron, dorsal aspect; scale bar = 1.0 mm.

cuate. Common oviduct with a small dorsal lobe (dlco, Fig. 9a, b), slightly deflected right.

DISTRIBUTION.—At present, known only from the Myohyang Mountains of North Korea (Fig. 10).

This isolated mountain range, located in central North Korea, forms portions of the borders between Chagang do and P'yongan-namdo and between Chgang do and Hamgyong-namdo provinces. Its axis trends northeast to southwest



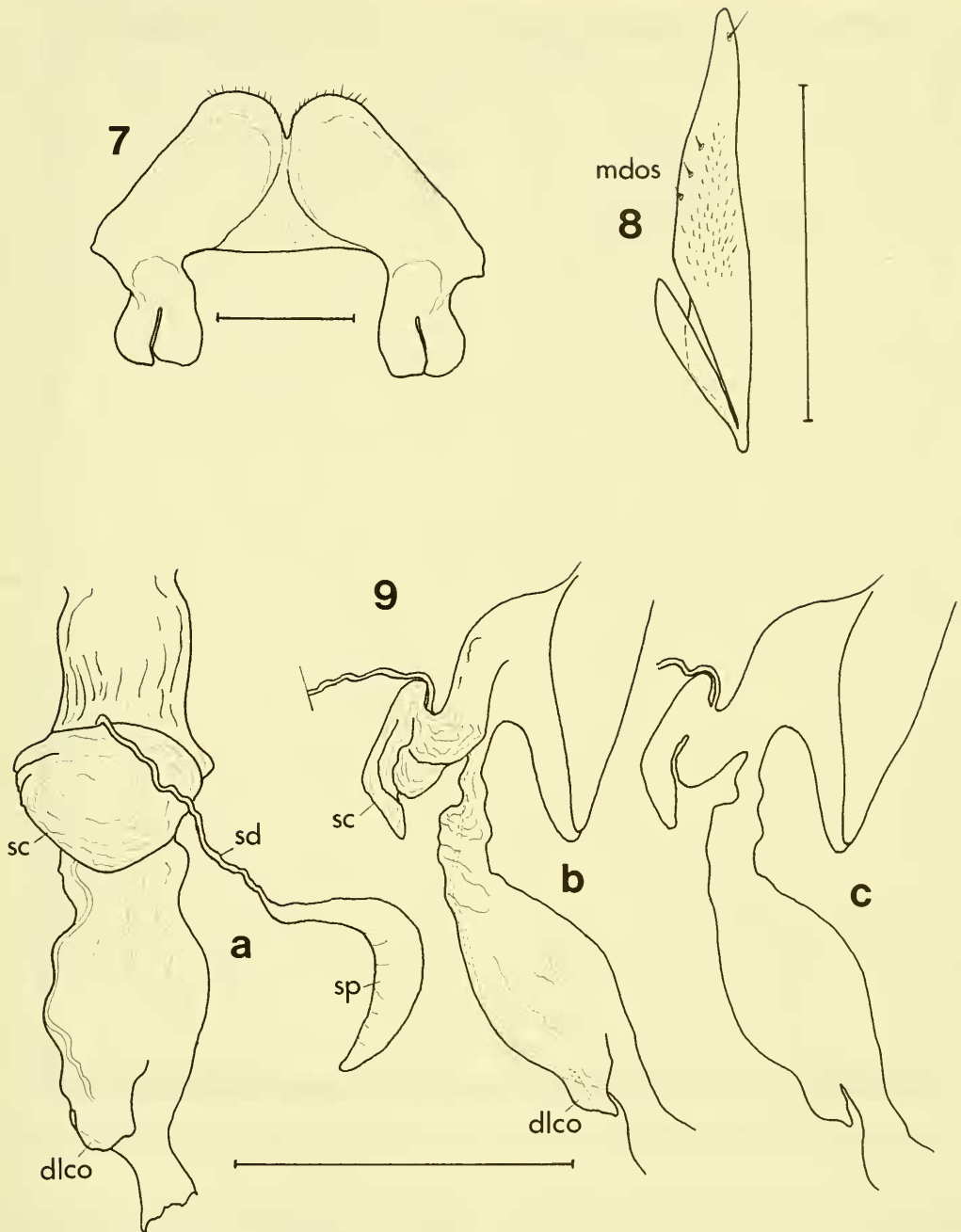
FIGURES 5 and 6. Male genitalia, *Nebria scaphelytra* n. sp. FIGURE 5. Median lobe of male; a = left lateral aspect; b = right lateral aspect; c = ventral aspect; everted internal sac, d = left lateral aspect, e = right lateral aspect; scl = sclerite. FIGURE 6. Parameres; a = left paramere, left lateral aspect; b = right paramere, right lateral aspect. Scale bars = 1.0 mm.

and forms the divide between the Ch'onch'on and Taedong rivers. The precise locality at which the type series was collected is unknown.

HABITAT DISTRIBUTION AND LIFE HISTORY. — Nothing is known at present about the habitat distribution of this species, nor of the

timing of its life cycle (no date of collection is recorded with the specimens).

AFFINITIES AND TAXONOMIC PLACEMENT. — Most adults of species in *Nebria* subgenus *Catonebria* Shilenkov (1976) share the following characteristics: (1) vertex with a pair of



FIGURES 7-9. Female genitalia, *Nebria scaphelytra* n. sp. FIGURE 7. Sternum 8 of female, ventral aspect. FIGURE 8. Ovipositor, right coxostylus (stylomeres 1 and 2), medial aspect; mdos = row of dorsal setae. FIGURE 9. Bursa copulatrix, spermathecal duct, spermatheca, and common oviduct; a = dorsal aspect; b = left lateral aspect; c = mid-sagittal outline, left lateral aspect; dlco = dorsal lobe of common oviduct; sc spermathecal chamber; sd = spermathecal duct; sp = spermatheca. Scale bars = 1.0 mm.

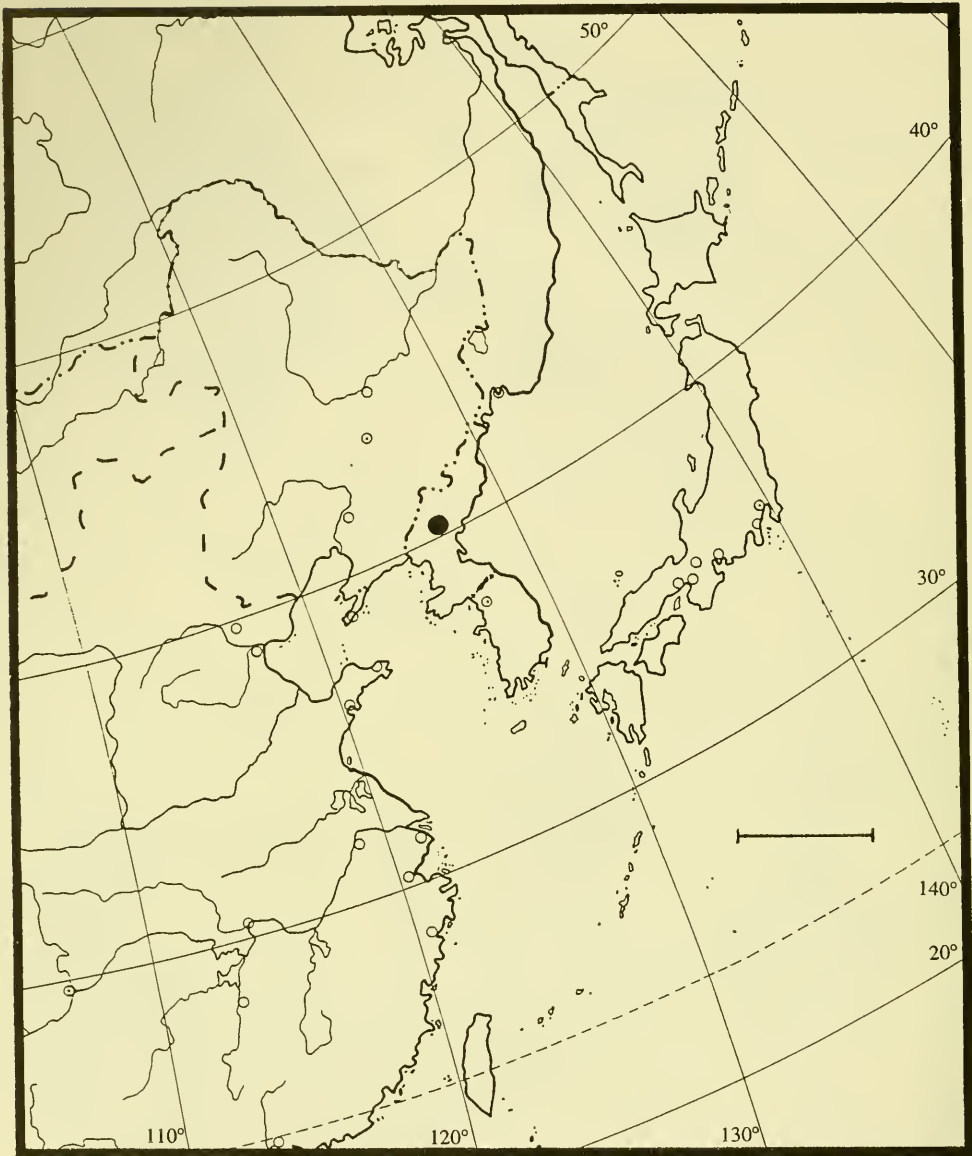


FIGURE 10. Map illustrating known geographical distribution of *Nebria scaphelytra* n. sp. (solid black dot); scale bar = 500 km.

paramedial red spots (2) upper surface with slight to marked metallic reflection; (3) longitudinal axis of antennal scape slightly arcuate; (4) midlateral pronotal seta present; (5) elytral discal setiferous punctures broadly foveate; (6) elytral intervals 3 and 7 (and also interval five in members of several species) with two to six setiferous pores; abdominal sterna 3–5 each with (7) two or more pairs of posterior

paramedial setae and (8) one or more pairs of anterior paralateral setae; and (9) male median lobe with midshaft moderately compressed (in cross-section). From this list, feature (4) is plesiomorphic within Nebriini, features (1) and (7) are synapomorphic with members of subgenus *Reductonebria* Shilenkov (1976), and the remainder are synapomorphies for *Catonebria*.

Adults of *Nebria scaphelytra* exhibit six of

these nine subgeneric features [namely, features (1), (4) through (7), and (9)] and three of six unique synapomorphies for *Catonebria* [namely, features (5), (6), and (9)]. Adults of *N. scaphelytra* and one or more other *Catonebria* species lack metallic reflection (e.g., *Nebria vandykei* Bänninger, *Nebria trifaria* LeConte, *Nebria ovipennis* LeConte), have the antennal scape straight (e.g., *Nebria gebleri albimontis* Kavanaugh and *Nebria spatulata sierrae* Kavanaugh), and have some or all members without anterior paralaral setae on abdominal sternum 3 to 6 (most species in the *ovipennis* species group). It seems clear that *N. scaphelytra* is most closely related to at least some species in *Catonebria* and, therefore, should be placed in that subgenus.

The *ovipennis* species group (Kavanaugh, 1978) of *Catonebria* includes *Nebria gebleri* Dejean, *Nebria mellyi* Gebler, *Nebria carri* Kavanaugh, *Nebria kincaidi* Schwarz, *Nebria spatulata* Van Dyke, and *N. ovipennis*. Adults of this group share the following features: (1) prosternal intercoxal process with margination in basal half only; male median lobe with (2) longitudinal axis of midshaft bent about 90°, (3) right lateral face of midshaft with a shallow but distinct basally-directed indentation or a pouch, and (4) axis of apex slightly deflected ventrally (in lateral aspect); (5) female sternum 8 with basal apodeme deeply emarginate, with lateral arm shorter than medial arm; and (6) gonostylus (stylocere 2) of female ovipositor with dorsal row of setae on medial face diagonal. All of these features are synapomorphies for the *ovipennis* species group, and *N. scaphelytra* adults exhibit four of them [namely, features (2), (3), (4) and (6)]. These four synapomorphies for *N. scaphelytra* and members of the *ovipennis* group provide solid evidence of close phylogenetic relationship.

Adults of the *ovipennis* subgroup (Kavanaugh, 1978) (*N. carri*, *N. kincaidi*, *N. spatulata*, and *N. ovipennis*) of the *ovipennis* species group share the following features: (1) eyes slightly reduced in size; (2) elytral silhouette ovoid, (3) elytron moderately short, (4) humeri markedly to extremely rounded, (5) humeral carina present, varied from faint and vaguely linear to very well-developed, projected, and markedly linear; (6) hindwing short, slender, strap-like; (7) median lobe of male with apical

orifice extremely deflected right; male parameres (8) asymmetrical, right slightly longer than left, (9) left paramere broad, pointed apically, (10) right paramere narrow, slightly elongate; (11) ovipositor of female with gonocoxa (stylocere 1) and gonostylus (stylocere 2) fused medially, narrowly divided laterally; and (12) bursa copulatrix of female with spermathecal chamber moderately cordate (in dorsal aspect).

Nebria scaphelytra adults exhibit nine of these twelve features [namely, features (1), (2), (4) through (6), (8), and (10) through (12)]. However, in *N. scaphelytra*, the elytra are elongate, not shortened; the apical orifice of the male medial lobe is markedly, but not extremely, deflected right; and the male left paramere is broadly rounded apically, not pointed. In addition, the invagination of the right lateral wall of the midshaft of the male median lobe is a shallow indentation, as in *N. gebleri* and *N. mellyi*. In contrast, members of the *ovipennis* subgroup have the invagination formed as a deep, basally-directed pouch. A feature shared by most members of *N. mellyi* and of the species of the *ovipennis* subgroup, but apparently not by members of *N. scaphelytra*, is the presence of a pair of paramedial setae (or, in some *N. ovipennis* members, a patch of short setae) on abdominal sternum 2. This synapomorphy suggests closer phylogenetic relationship between *N. mellyi* and the *ovipennis* subgroup species than between *N. scaphelytra* and either of these taxa. It seems probable to us that *N. scaphelytra* is the sister group of a clade including *N. mellyi* and the *ovipennis* subgroup; but such a relationship needs to be confirmed through formal phylogenetic analysis (currently in progress, DHK).

A particularly interesting apomorphic feature of *N. scaphelytra* adults is the absence of pronotal basolateral setae. This feature is shared with adults of *N. carri* and *N. kincaidi* of the *ovipennis* subgroup of *Catonebria*, and with members of subgenus *Eonebria* (Shilenkov, 1976; Sciaky and Pavesi, 1994), *Nebria superna* Andrewes (currently placed in subgenus *Psilonebria* Andrewes), and *Nebria nudicollis* Peyerimhoff (currently placed in subgenus *Spelaonebria* Peyerimhoff). *Nebria scaphelytra*, *N. carri*, and *N. kincaidi* clearly are closely related to species (e.g., *N. gebleri*

and *N. ovipennis*) in which basolateral setae are present. Furthermore, data already presented here suggest, for example, that *N. kincaidi* (members without basolateral setae) is more closely related to *N. ovipennis* (members with these setae) than to *N. scaphelytra*. These findings raise serious question about the usefulness of this feature as indicative of phylogenetic relationship at higher taxonomic (e.g., subgeneric and other) levels within *Nebria*, as has been suggested (see Sciaky and Pavesi, 1994).

In summary, and based on features already noted, it seems clear that *N. scaphelytra* is a member of the *ovipennis* species group of subgenus *Catonebria*. However, this distinctive taxon does not appear to be so closely related to species of the *ovipennis* subgroup as to warrant inclusion in that subgroup. This species represents only the second member of the *ovipennis* group known from the Palearctic Region, and it does not appear to have a sister group relationship with the other Palearctic species, *N. mellyi*.

ACKNOWLEDGMENTS

We thank Jerzy Pawlowski for providing us with the opportunity to study the specimens described in this paper. The carbon dust habitus illustration was rendered by Jenny Speckels.

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